PATENT
Attorney Docket No. 07481.0053-00000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
Kazuo TAGAWA et al.	Group Art Unit: 1797
Application No.: 10/591,500	Examiner: VASISTH, Vishal V.
Filed: May 25, 2007	
For: REFRIGERATING MACHINE OIL	Confirmation No.: 1464

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. § 1.132

I, Katsuya Takigawa, do hereby make the following declaration:

1. My name is Katsuya Takigawa, and I have a Bachelor's Degree in the field of Synthetic Chemistry from Faculty of Engineering, Kyoto University in Japan. I am employed by Nippon Oil Corporation, Central Technical Research Laboratory, where I have been engaged in the research and development of lubricant oils since 1987. I am familiar with the field of lubricant oils, particularly refrigerating lubricants.

2. I am an inventor named in the above-identified application, U.S. Patent Application No. 10/591,500 ("the '500 application"), and thus have read and understood the specification, drawings, and claims of the '500 application.

3. I have read and understand a Final Office Action in the '500 application, from the United States Patent and Trademark Office, dated May 5, 2011.

4. I have read and understand U.S. Patent No. 6,736,991 to Cohen et al. ("Cohen") and U.S. Patent No. 6,231,782 to Shimomura et al. ("Shimomura") cited in the Final Office Action.

5. Given my education and experience, particularly in the area of refrigerating lubricants, I consider myself competent to provide the following remarks.

6. The '500 application provides comparative tests for refrigerating machine oil compositions including a combination of mineral oil, phosphorothionate, and phosphoric acid ester. Specifically, each refrigerating machine oil composition set forth in Examples 4-6 includes a combination of the phosphorothionate (A2) and the phosphoric acid ester (A1), which correspond to the oil composition of claim 13 of the '500 application (see '500 application, paragraph [0129]). As shown in Tables 2-3, Examples 4-6 showed marked improvements in wear resistance from the synergistic effect of the combination of the phosphorothionate (A2) and the phosphoric acid ester (A1), as compared with Example 15 that included only the phosphoric acid ester (A1), and with Example 16 that included only the phosphorothionate (A2).

7. Neither Cohen nor Shimomura discloses or suggests such an improvement in wear resistance from the synergistic effect of the combination of the phosphorothionate and the phosphoric acid ester. Neither of the references discloses or suggests a combination of phosphorothionate and phosphoric acid ester. For instance, Cohen at column 7, line 3-5, discloses "anti-wear compounds for refrigeration [being] alkyl-aryl or tri-aryl phosphates," but does not disclose or suggest the specific combination of phosphorothionate and phosphoric acid ester. In the absence of the combination of phosphorothionate and phosphoric acid ester from Cohen and

Shimomura, one of ordinary skill in the art would not have expected the above-noted beneficial results from the synergistic effect of the combination of the phosphorothionate and the phosphoric acid ester in the refrigerating machine oil composition as required by claim 13 of the '500 application.

8. The Office Action at page 6 states that "example oils 4-14 merely demonstrate that the higher concentration of additives the lower the coefficient of friction. . . . [T]he oiliness improver (additive C) from the Tables . . . do lower coefficient of frictions and therefore adding these additives to a base oil to lower the coefficient of friction is hardly unexpected. Also, none of the additional additives, namely B1 and C1-5 from the Tables 2-3 of the instant specification, are reflected in instant claim 13."

9. The above allegations in paragraph 8 are improper for at least the reasons below. Examples 4-6 includes a combination of phosphoric acid ester and phosphorothionate, but do not include additive C (oiliness improvers) or B1 (epoxy compound). Even without additive C or additive B1, Examples 4-6 showed lower coefficients of friction compared to Examples 15 and 16. Even in Example 4, the coefficient of friction is lower than that of Examples 15 and 16. The total content of A1 and A2 in each of Example 4-6 is the same as the content of A1 in Example 15, and the content of A2 in Example 16. Accordingly, by the combination of phosphoric acid ester and phosphorothionate, superior property, i.e., lower coefficients of frictions, can be obtained. Furthermore, the oiliness agent (additive C) is a preferable element, but not essential to reduce the coefficient of frictions of the refrigerating machine oil.

10. In addition, neither Cohen nor Shimomura discloses or suggests "a mineral oil obtained by hydrorefining and/or hydrotreatment of not less than 93.5 % by

mass; . . . wherein a nitrogen content in the mineral oil is no more than 20 ppm by mass, a percentage of aromatic ring structure (%C_A) in the mineral oil is from 10 to 15, a sulfur content in the mineral oil is no more than 48 ppm by mass, and a kinematic viscosity of the mineral oil at 40 °C is 55.6-57.2 mm^2/s, as required by claim 13 of the '500 application for the reasons set forth in subsequent paragraphs.

11. The mineral oil composition disclosed in Cohen essentially differs from the composition required by claim 13. In Cohen, sulfur and nitrogen compounds in the mineral oil are present as an aromatic compound. The purification method of oil in Cohen is that contacting the oil with sulfuric acid to remove the sulfur and nitrogen compounds by oxidative degradation and condensation polymerization, and further removing the sulfur and nitrogen compounds with the aid of absorbent such as clay or bauxite that absorbs polar materials such as sulfur and nitrogen compounds. In Cohen, therefore, removing a sulfur compound and a nitrogen compound in the mineral oil means removing aromatic compound. There is a high possibility that the naphthenic mineral oil in Cohen has an aromatic content (%C_A) of no more than 8 when its sulfur content is no more than 48 ppm, in contrast to "a percentage of aromatic ring structure (%C_A) in the mineral oil is from 10 to 15, a sulfur content in the mineral oil is no more than 48 ppm by mass" as set forth in claim 13.

12. In contrast, in purification methods using hydrorefining or hydrotreatment, as required by claim 13, aromatic compounds containing sulfur and nitrogen react and combine with hydrogen, and sulfur may be removed as hydrogen sulfide, and nitrogen may be removed as an amine compound while aromatic moiety can remain the same.

13. In view of the above-explanation regarding the differences between the mineral oil disclosed in Cohen and the mineral oil as set forth in claim 13, if the example oils disclosed in Cohen having a sulfur content of 200 ppm or 300 ppm and $\%C_A$ of 14 or 12 (Cohen, col. 3, Table 1) were filtered such that the sulfur contents were reduced to no more than 48 ppm, then $\%C_A$ would be reduced to be below the range of 10-15 as required by claim 13, in contrast to the Office Action's statement at page 6 that "based on the entire disclosure of Cohen there is a likelihood that a base oil is disclosed with low sulfur content less than 48 ppm and that same base oil having an aromatic content of greater than 8 based on the disclosure of Cohen." Accordingly, considering Cohen's disclosed mineral oils, one of ordinary skill in the art would not have arrived at the refrigerating machine oil composition as set forth in claim 13 with a reasonable expectation of success.

14. I declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: August 2, 2011 By: Katsuya Takigawa
Katsuya Takigawa